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observed under the conditions just indicated, present here and there colorless lacunæ, at least in certain species of plants. In the second case, the walls of the cells are seen to stand out white upon a colored ground; the canals which traverse these walls are then visible because they are colored the same as the fundamental protoplasm itself.*

4. *Injection into organs.* I also tried to inject (slowly under pressure) into the organs to be studied a liquid capable of coloring the protoplasm; I then made cross sections of these organs. The injection rarely succeeded, but when it took place in a sufficiently uniform manner, this process led to a result identical with the preceding.†

IV. This unity (*ensemble*) of facts shows at least that in a great number of cases the cell walls permit the passage of protoplasm through narrow openings; so that in the tissues of a given plant, where up to a recent date we have only observed a multitude of small protoplasmic masses entirely isolated, there is in reality a single enormous protoplasmic mass.

It has seemed to me especially interesting to prove the existence of this structure in various parts of the same plant. For this purpose I have employed the box (*Buxus sempervirens*). Applying the methods 1, 2, 3, above mentioned, I have proved a continuity of the protoplasm in the stem and in the leaves of this shrub. From my investigations I am led to believe that in this species the protoplasm pursues, through incomplete cell walls, an uninterrupted course from the roots to the extremities of the leaves. *Ficus elastica* shows an analogous structure. The bearing of these facts on vegetable physiology and on natural philosophy will be considered in the near future.

[NOTE.—An English rendering of Dr. Schaarschmidt's paper "On the *Continuity of Protoplasm*," etc., may be found in *Nature*, Jan. 29, 1885, pp. 290–292. See also, *Nature*, Feb. 12, 1885, p. 337; Feb. 26, p. 290; and March 19, p. 459.—TR.]

GENERAL NOTES.

Esculent Plants of the Aborigines.—We are apprised that M. Paillieux, one of the Councillors of the French Society of Acclimatation, aided by M. Bois of the Museum of the Jardin des Plantes, are publishing a work on rare and curious esculent plants, and are anxious to bring as many of these as possible into cultivation in France. A request has reached us for seeds, bulbs or tubers, according to the species, of certain of our Western plants which the Indians use, or have used. By circulating the request in the BOTANICAL GAZETTE we may hope that it may meet with botanists or amateurs who will cheerfully contribute what they may. The list leads off with *Asclepias tuberosa*, the roots or shoots of which are said to have been eaten by the Sioux at the Upper Platte. One need not go so far for this, and, indeed, it should be obtained through *the trade.* Nor should it be difficult to get the fleshy roots of the common American Arrow-head, *Sagittaria variabilis*, though it might not so readily be had under its Chippewa name, *Wah-es-i-pinig.* Among those asked for are the *Lewisia rediviva*, *Valeriana edulis*, the various species of *Peucedanum* of the Idaho region, which the Indians eat the roots of, as also those of *Edosmia* (now *Carum*), those of *Balsamorrhiza incana* and *helianthoides*, of *Callirrhöe*, *Scorzonella* (section of *Microseris*) and of *Calochortus luteus*, also the seeds of *Œnanthe sarmentosa* (we fancy a poor substitute for celery), and of *Rumex hymenosepalus* (probably a poor pie plant), which abounds throughout southern California. The address of A. Paillieux is 21 Rue du faubourg Poissonnière, Paris.—A. G.

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* I have colored especially: *Triticum vulgare*, *Ficus elastica*, *Buxus sempervirens*, *Robinia viscosa*, *Cytisus alpinus*, *Amorpha glabra*.

† *Cytisus alpinus*.

The Investigation of Plant Diseases.—At the convention of influential agriculturists convened at Washington on the 8th and 9th of July by Commissioner of Agriculture Colman, the subject of plant diseases received considerable attention. There is manifestly a strong feeling throughout the country among the more thoughtful cultivators that the subject is one of immediate importance, and that its study should be encouraged to a greater extent than at present. No man stands in a better position to give a decided and substantial impetus to this movement than the head of the Agricultural Department at Washington.

It is, therefore, very gratifying to those who have the subject at heart to find that Mr. Colman has responded cordially to the memorial of the committee of the American Association appointed last year to encourage investigations into the health and diseases of plants, and that he has already secured Prof. Scribner to take charge of this work in the Department. That the commissioner is in earnest in his efforts is further evident from the considerable space given the subject in his address at the convention. We make room for the following extracts:

"Observations and conclusions published upon the origin and causes of diseases in plants are valuable or otherwise, according to the knowledge of vegetable economy possessed by those who favor us with their opinions.

"I am aware that in studying plant ailments it is extremely difficult in many cases to decide between a cause and a consequence. This has led to serious mistakes, as, for instance, a recent recommendation to cut down, "stamp out" peach trees, otherwise the fungus growth known as leaf blister, which is seen on peach trees occasionally during the period of leafing, would spread and destroy all the peach trees in the country. This, like most other destructive fungi on plants, being a consequence of diseased leaves caused by unfavorable climatic conditions, could not be "stamped out" permanently unless peach culture should be abandoned.

"It is well known that the profitable culture of some of our best fruits is rendered very problematical on account of their liability to fatal diseases. The pear blight is an example. Many apparently conflicting opinions have been published from time to time in regard to the cause of this malady, some attributing it to fungi, and others to bacteria, but withal, no remedy is suggested by microscopists so far as I am aware.

"Then again we have the serious question of grape mildew, which is really the cause of so much perplexity in the culture of this fruit, and gives rise to many conflicting opinions regarding the value of varieties in different sections and localities. Only the kinds most resistant of mildew can be cultivated profitably over a large portion of the country.

"Millions upon millions of dollars are lost annually by the ravages of blights, molds, rusts, smuts, and other vegetable diseases, and agricultural colleges can do a noble work in determining their causes and prescribing remedies."

In the discussion of the subject by the convention Dr. Phares, of Mississippi, offered a resolution to petition Congress to fully equip the Department for the more effective investigation of the fungous diseases of plants. A resolution was subsequently offered to have the seeds of the department subjected to the critical inspection of an expert on their quality, purity and vitality, and Major Alvord, of New York, deemed it best to have the two resolutions united, which was done. We think, this, however, an unfortunate disposition of the matter, but yet hope something may be accomplished.

What is now needed, as it appears to us, is a well equipped laboratory with a corps of trained specialists, who shall also be permitted to study the diseases in those parts of the country which offer the most favorable conditions for their investigation in the field. To make the work entirely successful it should constitute a separate division or bureau of the Department on an equal footing with that of botany, entomology, animal diseases, etc., and might very appropriately be called the *bureau of plant diseases.* The co-operation of the agricultural colleges, experiment stations and private investigators could be secured, and great scientific and economic service be rendered the country.—EDS.

EDITORIAL NOTES.

THE UNIVERSITY OF NEBRASKA has established a botanic garden.

DR. KLEIN'S work on micro-organisms has been translated into French.

A WORK of 300 pages has just been published in Berlin on J. J. Rousseau as a botanist.

PROF. V. M. SPALDING has been detained from going abroad to study by the illness of his wife.

PROF. J. M. COULTER is engaged during the summer on geodetic work in the southern part of the state, near New Albany.

DR. O. J. OLSEN has received a grant of $250 from the Norwegian government with which to continue his studies on native edible mushrooms.

THE VACANT PAGE of the last number was due to a misunderstanding of the printers. The GAZETTE can ill afford to leave blank any of its much needed space.

A SMUT on cultivated violets, *Urocystis Violæ,* attacking the leaves and flower stems, has made its appearance in France, as we learn from the *Revue Mycologique,* and has proved very destructive.

PROF. CHARLES R. BARNES, of Purdue University, has been granted a year's leave of absence, and will spend the time at the Botanic Garden, Cambridge, Mass., in the prosecution of some special researches.

DR. WARMING, of the University of Stockholm, has received a call as professor of botany in the University and director of the botanic gardens of Copenhagen, Denmark, and will begin his labors on November 1.